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KELL, R.E.		
KIRBY, W.A.		
KUESTER, A.W.		
MAHAFFEY, J.W.		
MANN, H.P.		
MARX, G.E.		
McKENNA, F.G.		
MORGAN, R.V.		
PIZZUTO, V.M.		
POTTER, G.L.		
SANDLIN, N.B.		
SATTERWHITE, D.G.		
SCHUBERT, A.L.		
SETLOCK, G.H.		
STIGER, S.G.	X	X
SULLIVAN, M.T.		
SWANSON, E.R.		
WILKINSON, R.B.		
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Levin M	X	X
Singer S	X	X

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Well Evaluation Report

Ned Hutchins, Acting Associate General Manager
Environmental Restoration Department
EG&G Rocky Flats, Inc.

DOE/RFO has completed its review of your draft final Well Evaluation Report (WER). Please ask your staff to finalize the report in accordance with the attached review comments (Attachment B). Early in 1993 this report was promised to the U.S. Environmental Protection Agency and the Colorado Department of Health as the last part of a three phase evaluation of the Rocky Flats Groundwater Monitoring Program (GWMP). Therefore DOE will transmit copies of the final report to the regulators.

The most politically sensitive part of the draft WER is its projections of groundwater contaminant plume migration east to Indiana Street over the next 5 years. As stated in the attachments, DOE is concerned with the projections given, and feels additional information needs to be collected before coming to this conclusion. Therefore, DOE requests that EG&G quickly scope and perform an accelerated fate and transport modeling investigation (per the first item on Attachment A) of the potential for contaminant plume movement down the Walnut and Woman Creek drainages. From technical discussions between our staffs, DOE believes that this high priority effort is feasible during the remainder of FY1994 by re-prioritizing existing, sitewide groundwater modeling efforts.

Attachment A identifies a number of other improvements to the GWMP which DOE would like to see implemented. DOE requests a meeting to discuss these improvements, and that your Geosciences staff scope and cost these improvements to include in your FY1995 work packages. If you desire clarification please call me at extension 3424, or call Ralph Lindberg of my staff at extension 8285.

Gail S. Hill

Gail Hill, Acting Director
Environmental Protection Division

Attachment

cc w/oAtt:
M. Levin, EG&G
S. Singer, EG&G

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A-SW-002135

Attachment A

Requested Improvements to the Rocky Flats Groundwater Monitoring Program

Plume Migration Predictions and Fate & Transport Modeling

Draft final Well Evaluation Report (WER) plates (e.g. 2-125 through 2-128) predict 5 year contaminant plume movements down the alluvium in the Walnut and Woman Creek drainages. Many of these plates suggest that various plumes may reach the Indiana Street boundary within 5 years. This is good work since it alerts DOE and EG&G to the possibility that groundwater contamination may be able to migrate relatively rapidly through the alluvium. However, we believe that these plume predictions may not be accurate since they have not taken into account many important hydrologic and geochemical factors such as the existence of retention ponds with impermeable dams, analyte dispersion, retardation and decay, as well as work already done by EG&G on the sitewide groundwater model. DOE does not wish to falsely and prematurely alarm Rocky Flats stakeholders with predictions of 5 year plume movements, until such predictions can be made with much higher confidence. We believe launching a detailed fate and transport modeling study as soon as possible may give us better information to confirm or refute these projections. This study could use a small number of 'indicator contaminants' such as tritium, Am-241, and nitrate.

DOE requests that EG&G: (1) prioritize, scope, and fast-track a detailed fate and transport modeling study of contaminant plume movements in the Walnut and Woman Creek basins; (2) produce a summary report and schedule a formal presentation for DOE which describes the modeling approach, assumptions, limitations, conclusions, available data, and future data needs for refining the modeling as soon as possible and not later than May 27, 1994. The report and presentation must specifically address the potential for known contaminant plumes to reach the Indiana Street boundary. (3) Because of concerns with the plume projections, DOE requests that the 5 year plume predictions (both plates and textual discussion) be removed from the final Well Evaluation Report, pending results from the modeling study, but retained in the draft final report for use by in-house DOE and EG&G staff.

At EG&G's discretion parallel hydrogeologic and geochemical study may need to be scoped to collect additional data during FY94 and FY95 to enhance the modeling and to define groundwater-surface water interactions around the ponds. This study might use Geoprobe equipment to rapidly put in low cost 1" piezometers between the A-series ponds, between the B-series ponds, and perhaps locally upgradient of Pond C-2. In OU5 ASI reportedly used pneumatic Geoprobe equipment mounted on an ATV to install about 6 piezometers per day.

Additional Monitoring Wells

DOE requests the installation of additional alluvial monitoring wells to enhance plume tracking, and help define groundwater interactions with surface waters. Discussions with Geosciences staff and G. Litus have suggested the following locations for new alluvial wells :

- No Name Gulch 1500' downgradient of 0686
- Walnut Creek 1000' downgradient of 0181 (FY94 WARP well 10794)
- Walnut Creek 1000' upgradient of 41691 (FY94 WARP well 10894)
- N. Walnut below A-1 dam and upgradient of the spray evaporation site
- N. Walnut 400' downgradient of A-3 dam

Anomalous Groundwater Chemistry Areas
The WER includes a preliminary, sitewide assessment of groundwater contamination by selected chemicals. A number of previously known plumes were reconfirmed, and some new groundwater chemistry anomalies were identified. These anomalies should be called to the attention of the relevant OU managers for confirmation and further study.

High Turbidity Wells
RFP has a large percentage of high turbidity (some >300 NTU) and high TSS wells because these wells are screened in friable claystones and siltstones. CDH and DOE have been concerned that this suspended sediment results in highly variable analyte concentrations when unfiltered samples are analyzed. This is because some analyte concentrations may be correlated with the amount of sediment in a water sample. Secondly, impending EPA RCRA guidance [1] seems to define high turbidity as anything over 5 NTUs. Wells with higher turbidity are assumed by EPA to be improperly constructed and/or developed until proven otherwise by the owner/operator. EPA [1] is strongly opposed to routine filtration of water samples to control turbidity, and is opposed to filtration for routine RCRA characterization purposes. However, note that we can not cease all sample filtration since Colorado Water Quality Control Commission Standards refer to filtered samples, and some filtered water data is necessary for special studies like equilibrium modeling and characterization of the redox environment.

The GWMP must be able to demonstrate that DOE and EG&G: (1) are aware of the high turbidity problem, (2) have evaluated the causes of turbidity in our wells, (3) have investigated alternative well construction, development and sampling procedures to minimize it, and (4) that we are either using, or moving towards the use of optimum well construction and development procedures to reduce the problem. It is requested that the GWMP take control of the turbidity issue by planning and budgeting for the following three special studies.

Re-evaluate Well Installation Procedures at RFP
Determine appropriate sandpacks and screen slot sizes to control high turbidity in new RFP wells installed in claystone and siltstones. Evaluate grain size distributions in alluvial and bedrock units and re-determine the appropriate sandpack grain size range. There may be little justification for using a standard 16-40 sandpack and 010 slot size for all wells..

Re-evaluate Well Development Procedures at RFP
Re-evaluate Well Development Procedures for use at RFP. Numerous high-pH or high turbidity wells exist at RFP which refuse to clean-up, or require years to do so. Perhaps high pH wells can be acclimated by high-energy development, extensive pumping, or in poorly producing wells, by adding tap water and pumping it out again.

Re-evaluate Groundwater Sampling Protocols to Reduce Turbidity
EPA [1] suggests avoiding the use of bailers by using surface or downhole pumps and purging stagnant water only from the well screen area. This would have the advantages of: (1) reducing the purge water volume that we have to handle and treat, (2) maximizing the amount of well water remaining for sampling, enabling the collection of a higher percentage of full suites, and (3) minimizing the amount of suspended sediment in the well water.

Identify and Analyze RFP-Specific Chemicals
Except for the "standard" isotope-specific nuclide list, the routine groundwater analyte suites at RFP look for the contaminants commonly found at non-nuclear superfund sites. Some 'library research' and interviewing of longtime or former RFP employees should

be done to identify chemicals either unique to Pu and U processing, or known to have been used in abundance at RFP. These chemicals would not necessarily be added to the routine analyte lists, but could be analyzed in a small number of selected wells. If they are undetected after two sampling events in the semiannual monitoring network, we could stop looking for them. Wells in areas like the 881 hillside and north of the Solar Ponds might be good locations for this.

Examples of DOE-specific analytes used at RFP include gallium (commonly alloyed with Pu); tributyl phosphate (TBP) and kerosene (both used in the Purex process); oxalates (used in Am and Pu recovery); Np-237 and Cm-244 (both had long-term use at RFP); tertiary amines (e.g. trilauryl amine for Pu extractions); and even ordinary ammonia and ammonium ion (ammonium salts are used in Pu processing).

Some of the expanded nuclide determinations in groundwater samples might be done by LANL (D.W. Efurd, D.J. Rokop and R.E. Perrin). This group recently completed a characterization of nuclides in RFP surface water and sediments and is seeking additional work at RFP [2].

Confirmatory Water Level Investigation
The WER (pages 2-56 and 4-32) echoes a DOE concern about the reliability of our water level data when it says, "The hydrographs associated with each trend plot appeared to have large, random fluctuations in water levels...". A few wells with 'wild' hydrographs should be singled out for a special weekly (or daily) water level study, done by EG&G personnel independent of the groundwater subcontractor field crews. Alternatively, we could put transducers in a few wells with data-loggers to capture a long-term continuous record. The results of this study should either verify the wild oscillations seen in these wells, or indicate a serious data integrity problem. The fault is probably not with the subcontractor, but in measuring water levels when a well has not fully recovered from a prior sampling event.

Characterize Groundwater Redox Environment at RFP
Redox data are important for studies of contaminant fate and transport, and for proper characterization of the groundwater environment at RFP The literature indicates that contaminant mobility is often valence-specific. Uranium (VI), for example, is highly mobile, while uranium (IV) is quite immobile. At present, we probably lack any credible data on RFP groundwater redox environments.

The RFP groundwater redox environment could be determined by flow system or by geologic unit at a small number of representative wells by using a combination of in situ specific-ion-electrode, or flow-through-cell measurements. Specially preserved samples could also be analyzed (valence-specific analyses) for some redox indicator species. It is suggested that analyses be included for: DO (measured in situ), sulfide, sulfate, nitrate, nitrite, ammonia, ferrous and "total" iron (although the sample must have been filtered at 0.10 microns to compute 'dissolved' ferric iron by difference, total - ferrous). This data with water temperature and pH, will allow computation of pe levels for the following redox couples: oxygen-water, ferrous/amorphous $Fe(OH)_3$, ferrous/ferric, nitrate/nitrite, nitrite/ammonia, sulfide/sulfate, sulfide/rhombic sulfur. Eh measurements have generally not been attempted at RFP and are probably meaningless with respect to the dominant redox couples in solution.

Evaluate Appropriate Sampling Techniques for Anions
A small project might determine if RFP should modify existing SOPs to collect filtered groundwater samples for routine anion analysis. The task is to collect both filtered and

unfiltered groundwater samples from a small number of selected wells and statistically compare their anion contents. As Rob Smith (EG&G Geosciences) once pointed out, USGS references suggest that we should be filtering water samples prior to analysis for some major anions. Historically RFP has analyzed unfiltered anions (with the possible exception of orthophosphate). It has been assumed that most anions exist in groundwater predominantly in the dissolved (aqueous) phase. However, it is possible that substantial amounts of some anions may be present in the particulate or suspended fraction. Carbonate, for example, may be present as solid $CaCO_3$, while dissolved carbonate is a minor aqueous species at neutral pH. Thus we might expect different carbonate concentrations for filtered and unfiltered samples of turbid water (Filtration for anions may become a moot issue if we can solve the well turbidity issue).

GWMP Analyte Changes

It is suggested in the WER that CWQCC standards apply to Cs-134, but that we routinely analyze for Cs-137 instead. If this is true, then the GWMP should at least analyze boundary wells for Cs-134.

Per discussions with GWMP personnel, it is suggested that the program stop making field measurements of total alkalinity, and instead substitute laboratory-measured total alkalinity, except when field alkalinity measurements are required by RCRA or an OU workplan. This should save the field crews time and improve the accuracy of the alkalinity data.

With its short holding time and filtration requirements, water samples collected for orthophosphate have been a pain for the field crews. It is suggested that samples for orthophosphate analysis be collected for two successive events at each new well in the semiannual monitoring network, and thereafter be discontinued at those wells unless specifically required by an OU workplan.

References Cited

[1] EPA, 1992, RCRA Groundwater Monitoring: Draft Technical Guidance. EPA/530-R-93-001 or PB93-139350, November, 1992.

[2] Efurd, D.W., Rokop, D.J. and Perrin, R.E., 1993, Characterization of the Radioactivity in Surface Waters and Sediments Collected at the Rocky Flats Facility. LANL LA-UR-93-4373.

Attachment B

DOE Review Comments on the draft final, Well Evaluation Report

General Comments

1. Our overall impression of the WER is that this four volume report is well written and comprehensive. It's too bad we were unable to write it several years ago!

2. DOE has asked EG&G to re-assess the wells included in the GWMP on at least a quarterly basis. It's not clear how the GWMP will implement and track the monitoring recommendations made in the WER. Will the new GWMP rely on maintaining a spreadsheet to determine which wells no longer need to be sampled?

3. It appears that the newly proposed monitoring network will eliminate about 114 wells (Table 4-4) from the GWMP. However, it is not clear from the document whether proposed new well installations and additional analyses will result in a net increase or a net decrease in program size/cost? Please provide DOE with a summary of the final size and annual cost of the revised program as presently planned.

4. The following text block is deliberately duplicated from DOE Attachment A for the benefit of EG&G subcontractors finalizing the Well Evaluation report.

> Draft final Well Evaluation Report (WER) plates (e.g. 2-125 through 2-128) predict 5 year contaminant plume movements down the alluvium in the Walnut and Woman Creek drainages. Many of these plates suggest that various plumes may reach the Indiana Street boundary within 5 years. This is very good work since it alerts DOE and EG&G to the possibility that groundwater contamination may be able to migrate relatively rapidly through the alluvium. However, we believe that these plume predictions may not be accurate since they many important hydrologic and geochemical factors such as the existence of retention ponds with impermeable dams, analyte dispersion, retardation and decay, as well as work already done by EG&G on the sitewide groundwater model. DOE does not wish to falsely and prematurely alarm Rocky Flats stakeholders with predictions of 5 year plume movements, until such predictions can be made with much higher confidence. We believe launching a detailed fate and transport modeling study as soon as possible may give us better information to confirm or deny these projections. This study could use a small number of 'indicator contaminants' such as tritium, Am-241, and nitrate. DOE requests that EG&G: (1) prioritize, scope, and fast-track a detailed fate and transport modeling study of contaminant plume movements in the Walnut and Woman Creek basins; (2) produce a summary report and schedule a formal presentation for DOE which describes the modeling approach, assumptions, limitations, conclusions, available data, and future data needs for refining the modeling as soon as possible and not later than April 15, 1994. The report and presentation must specifically address the potential for known contaminant plumes to reach the Indiana Street boundary. (3) Because of concerns with the plume projections, DOE requests that the 5 year plume predictions (both plates and textual discussion) be removed from the final Well Evaluation Report, pending results from the modeling study but retained in the draft final report for use by in-house EG&G staff.

5. The WER does not appear define operational criteria needed by the GWMP such as: what constitutes a redundant well; when can sampling of a well be terminated when the well is located within a contaminant plume; when and where do you install wells downgradient of a plume; how many sampling events are required to meet a given objective (e.g. CERCLA characterization)?

Specific Comments

Page ES-2, last bullet. This bullet concludes that the distribution of contaminant plumes is similar in shallow bedrock and alluvial deposits indicating a hydraulic connection. My experience is that this is locally true, but certainly not always true. I see different plume shapes, extents and analytes when comparing the upper and lower flow systems. I think the bullet should be 'toned down'.

Figure 1-1. On the south end of this figure change 'Warston Lake' to 'Marston Lake'.

P. 2-3, 2nd para. Suggested change: "valley slopes in the middle portion of RFP" to "valley slopes along the Rock and Walnut Creek drainages of RFP."

P. 2-12, 4th para. I partially disagree with the comment about having insufficient data to use hydrostratigraphic units instead of lithostratigraphic units. We may lack the hydrological detail needed to precisely define the "hydrostrat" units, but we have operationally used the concept of an upper and a lower flow system quite well at RFP. The now abundant groundwater chemistry data are probably an excellent hydrostrat correlation tool. In general the alluvial units share a similar water chemistry while the lower flow system (unweathered Cretaceous rocks) has different chemistry.

P. 2-12, last para. The text says that the early April and early October measurements correspond to "high" and "low" flow periods at RFP. At best early April is near the start of high precipitation, while early October is near the start of low fall and winter precipitation. This doesn't allow for any time lag. The RFP EIS report (1980, page 2-67) shows average precipitation over 24 years. This indicates that the end of the "high water" period is probably the last two weeks of September, and the "low water" period should be the last two weeks of February. I'm not sure if water level measurements bear this out?

P. 2-32, Fig. 2-6. The data flow diagram looks good, but were data examined to ensure that both activity and concentration units were standardized prior to use in statistics?

P. 2-33. The 6th chemical down the page should be changed from trichloroethane to trichloroethene (TCE).

P. 2-39, 3rd and 4th para. The 99/99 UTLs are presented in Appendix C of the EG&G (1993) published, Background Geochemical Characterization Report. Therefor, the reference should be changed from a personal communication (Siders, 1993) to instead reference the published report. The same holds for the last footnote on page 2-45.

Section 2.3.1.4 Trend Plots. There seems to be no discussion of what was learned from all the trend plots that were produced. Any general conclusions? At least discuss Figure 2-7.

P. 2-51, Pesticide and PCB Assessment. This section simply says that data from 84 wells were evaluated for pesticides and PCBs. To help the reader, it should reference the later discussion of what was found in Section 2.3.2.6.

P. 2-53, 2nd para., second sentence. I'm not sure if the WER included tritium data in its assessment, but tritium at up to 10,000 pCi/L is one of the major contaminants found at the Solar Ponds.

P. 2-55. The conclusion that "Large scale contaminant migration is not indicated by comparison of 1990 and 1992 data" is at odds with the contaminant transport modeling of page 2-57 and the plates which show 5 year plume movement to Indiana Street. Some statements should be added to reconcile this.

P. 2-57 Contaminant Transport Modeling and associated plates 2-125 to 2-128. Although this modeling is admittedly simplistic and the projections of 5 year plume movement are therefore somewhat 'alarmist', this is a very nice part of the WER! It will force all parties to examine the possibility that some RFP groundwater contamination may be moving offsite, and respond to that possibility.

P. 2-58 last para. Update to the well B303089 and B205589 saga. In January, 1994, at the request of DOE, EG&G (R. Reiman and Kyle Dyer) made in situ gamma spectroscopy measurements of the surface soil in the vicinity of wells B205589, B303089, and the small domestic landfill located about 400' north northeast of Pond D-2. All three gamma spectra suggest background conditions exist at these sites. Uranium isotopic ratios suggest that the uranium in these wells is of natural origin, and no surficial anomalies of Pu or Am were observed. None of these sites are near known RFP IHSSs. Therefor, the extensive discussion of these areas in Section 2.3.2.5 should probably be toned-down a little. The pre-RFP domestic landfill seems to have been vindicated as a possible nuclide source. Although it is very small in extent, it is still possible that it may have contributed to the non-radionuclide species seen in well B303089.

P. 2-58 last para. It is not true that "...at times total radionuclide data are as high as those from the Solar Evaporation Ponds". However, it is possible that U-238 activity may be comparable to U-238 levels observed in the Solar Ponds contaminant plume. Please confirm this.

P. 2-59, 3rd para. This paragraph and the next talk about "...consistently elevated concentrations of lithium". My question is, "Elevated relative to what? Background 99/99 UTLs? CWQCC groundwater standards?"

P. 2-60 1st para. IHSS 209 is in my opinion an unlikely source of contamination and it should probably be left out of this discussion?

P. 2-60 Pesticides. I like to see data interpretations and recommendations! It's nice to see that pests and PCBs do not appear to be a widespread groundwater problem at RFP and their routine analysis can be curtailed! Good Job! P.S. What about herbicides?

P. 2-62, Table 2-4 on DNAPLs. In the analyte column please correct the chlorobenzene formula from C_6H_6Cl to C_6H_5Cl. Secondly, solubility data vary a lot in the literature, but please check your values for the following chemicals. I think your solubilities are typically a factor of 10 less than mine (located below). Your choice of solubility will probably affect your well list of DNAPL candidates. Regardless of your data source please provide a reference to your data source on Table 2-4.

Analyte	Your Value	My Value*
1,1-DCE	400 mg/l	2500 mg/l
1,2-DCE	600	3500 to 6300
PCE	150	1503
vinyl chloride	60	2763

* My values from: Howard, 1990, Handbook of Environmental Fate and Exposure Data for Organic Chemicals. Vol. 1&2, Lewis Pub.

P. 2-63 last bullet. I think this conclusion is too general as stated. Where, or in which OUs do you find a similar spatial distribution of alluvial and bedrock plumes?

Figure 3-1. This is a nice table of regulatory requirements affecting groundwater monitoring. What do you think about adding well construction and permitting requirements from 2 CCR 402-2?

P. 3-14, 1st para. It is stated that the FFCA requires RFP to monitor groundwater in the vicinity of the sludge drying beds at the STP. I may have missed it, but I do not see this requirement by any well listed in the semiannual program (Table 4-2), or in the quarterly program (Table 4-3)? If it is not there, please add it in as a "well purpose."

P. 3-21, Table 3-3. Let's get to the bottom of a confusing issue! This table says there is a state groundwater standard for Cs-137. Meanwhile Table 3-8 footnote 6 (page 3-33) says the CWQCC standard is for Cs-134. Let's confirm that it is really a Cs-134 standard and that there is no Cs-137 standard. If true we can stop analyzing for Cs-137 and start analyzing for Cs-134!

P. 3-33 Table 3-8. Please check the tritium PQL of 1200 pCi/L which seems very high compared to our existing tritium data.

P. 3-43 CWQCC Hearings. Please revise the text to reflect what actually happened at the December, 1993, CWQCC hearings. Reference the written record if necessary.

P. 3-43, last bullet. I would like clarification and a reference supporting this statement on using the PQL when it is less stringent than the table standard. For example, if the PQLs for Pu and Am are 0.2 pCi/L and the RFP groundwater standards are 0.05, should we really compare all our data against the PQL instead of the standard?

P. 4-9, Table 4-2. Please try to estimate the lithology that active well 3187 is screened in. If we don't have a log maybe we can use the new downhole camera? The same goes for all the wells in Table 4-2 with "?" in the screened interval.

Table 4-3, last page. Well 43392 is completed in Qrf according to my copy of the Warpmeister's well spreadsheet.

Table 4-4 is great!!!

P. 4-22 end of 2nd para. The text says that in wells that dewater allowing collection of only partial suites, it is recommended that the remaining samples be collected during interim quarters. This should be a last resort. I think a better approach is to change the way we purge wells and try to reduce the purge volume by locally purging the screened interval. This means less purge water to handle and treat and more water for samples.

P. 4-24, Section 4.3 Analytical suites. This section needs some work. There is no follow-up on the earlier (p.3-17 to 3-18) discussion of Appendix IX and CWQCC analytical suites. There is no discussion of "location-specific suites" although this is promised at the bottom of page 4-24. It is not clear what the regulatory or programmatic basis is for the "comprehensive suite" of Table 4-5, or how it relates to CWQCC groundwater standards? To filter or not to filter is an important issue to the GWMP, so there should be a discussion of this issue somewhere in the WER. Should we routinely analyze unfiltered samples (per EPA RCRA guidance), and analyze filtered samples only at the "point of compliance" for comparison with CWQCC filtered standards? There is no discussion of the Cs-137 versus Cs-134 issue. Table 4-5 still says run Cs-137 but the CWQCC standards apparently apply to Cs-134.

P. 4-26, Table 4-5 continued. The text should explain the rational for the Table 4-5 dual suites (filtered and total Pu, Am) and why this is only for Pu and Am? Both Table 4-5 and the text ignore field parameters like pH and specific conductance. Sorry, but it's sloppy to say "VOCs" and "SVOCs" in the table without supporting method numbers or discussion in the text. Table 4-5 must tell RFP whether to use 500 series methods with low detection limits or CLP methods. What herbicides should we look for? Cyanide is listed separately, although it normally comes with the target analyte list (CLP TAL) metals. Should a comprehensive suite include total petroleum hydrocarbons (TPH) since we have numerous diesel spills and historically a "diesel seep" on the 881 hillside? Finally, the "comprehensive" suite doesn't include parameters like COD, TOC and NH_3 which are required for the Present Landfill wells (refer to Table 3-1).

P. 4-25, Figure 4-1. The flow chart (Figure 4-1) does not consider that GWMP CERCLA wells are monitored for analyte lists defined by OU workplans. In the top diamond the comprehensive suite should probably be sampled twice in new wells in the semiannual monitoring program before re-defining the well purpose or proceeding to a shorter analyte list. However, this may not be possible in the case of new CERCLA wells which come into the GWMP with a pre-ordained analyte suite.

P. 4-25, Figure 4-1 continued. Sorry, but I don't see the logic to the second diamond down from the top and the rectangle to its right. At this point we have already run the comprehensive suite (maybe twice) so we already know what's in the water for both "RFP-related" and "Non-RFP-related" constituents. Why do we need this diamond or the rectangle to its right which tells us to re-sample for "Non-RFP-related Analytes"? Did we miss some of these back on the "comprehensive" list?

P. 4-27, Table 4-6. Again this table and the supporting text needs work. What is the justification for "CLP metals"? Which VOC method is to be used? What methods and detection limits are appropriate for comparisons with groundwater standards? It's not your fault given scoping and time constraints, but Table 4-6 is not really a good "RFP-specific" analyte list. EG&G Geosciences has been independently asked to research such a list. I'm talking about identifying byproducts and chemicals used in Pu and U processing like: tri-n-butylphosphate, kerosene, ammonium salts, trilauryl amine, oxalates, gallium, etc.

P. 4-29, 2 sentences from bottom. Typo, change Section 4.1.1.2 to 4.2.1.2.

The WER has a lot of good suggestions in Sections 4.5.1 and 4.5.2. DOE and EG&G will try to follow your advice.